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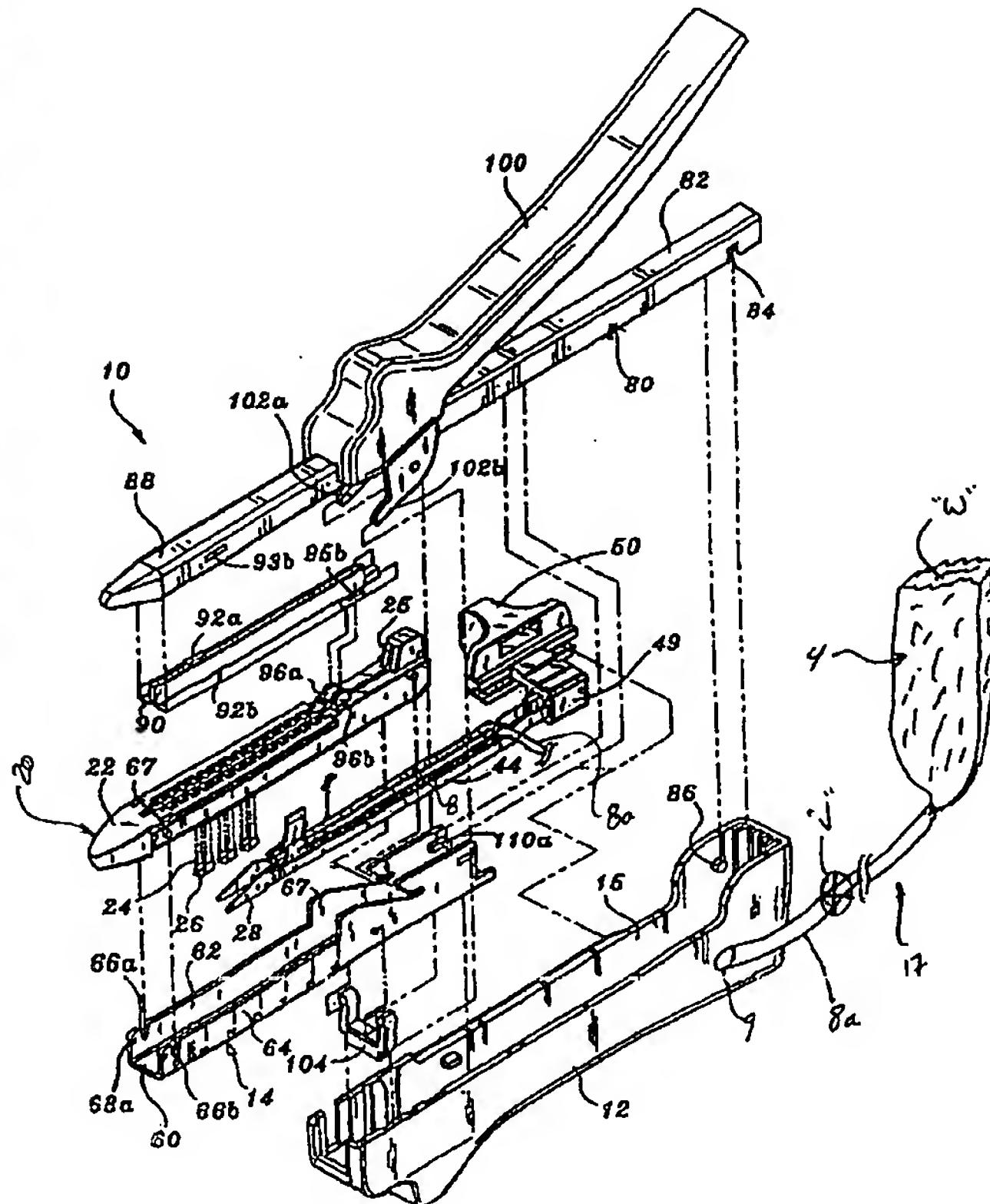
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(54) Title: SURGICAL STAPLING APPARATUS HAVING A WOUND CLOSURE MATERIAL APPLICATOR ASSEMBLY



(57) Abstract: This disclosure relates to surgical stapling apparatus for enhancing one or more properties of body tissue that is or is to be repaired or joined. The apparatus includes a staple anvil, a staple cartridge, a driving member for driving the surgical staples from individual staple slots in the staple cartridge and against the staple anvil, and a wound closure material applicator assembly. The applicator assembly includes at least one conduit extending along at least a length of the driving member, anvil and/or cartridge and at least one reservoir in fluid communication with the at least one conduit, the reservoir containing a wound closure material therein. The staples can be coated with a wound closure material.

WO 03/094746 A1

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SURGICAL STAPLING APPARATUS HAVING A WOUND CLOSURE MATERIAL APPLICATOR ASSEMBLY

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CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims the benefit of and priority to U.S. Provisional Application Serial No. 60/379,956 filed on May 10, 2002, the entire contents of which are incorporated herein by reference.

BACKGROUND

1. Technical Field

This disclosure relates to surgical stapling apparatus, and more particularly, to a surgical stapling apparatus having a wound closure material applicator assembly for applying a plurality of surgical fasteners to body tissue and dispensing a quantity of wound closure material, such as an astringent, to reduce and/or prevent staple line and/or knife cut line bleeding.

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2. Background of Related Art

Surgical procedures requiring cutting of tissue can result in bleeding at the site of the cutting. Various techniques have been developed to control bleeding with varying degrees of success such as, for example, suturing, applying clips to blood vessels, and using surgical fasteners, as well as electrocautery and other tissue healing techniques.

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Surgical instruments using surgical fasteners entail grasping or clamping tissue between opposing jaw structure and then joining the tissue by employing the surgical fasteners. These instruments are well known in the art. In some instruments a knife is provided to cut the tissue which has been joined by the fasteners. The fasteners are typically in the form of surgical staples however, two part polymeric fasteners can also be utilized.

Instruments for this purpose can include two elongated or circular members which are respectively used to capture or clamp tissue. Typically, one of the members carries a cartridge which houses a plurality of staples arranged in at least two lateral rows while the



other member carries an anvil which defines a surface for forming the staple legs as the staples are driven from the cartridge. Where two part fasteners are used, one of the members carries a cartridge which houses one half of a fastener while the other member carries the second part of the fastener, e.g., the mating part, which halves are configured and adapted to be held together upon approximation. Typically, the stapling operation is effected by a drive member which travels longitudinally through the cartridge carrying member, with the drive member acting upon the pushers which engage the staples to sequentially eject them from the cartridge. A knife can be provided which travels between the staple rows to longitudinally cut (i.e., form a knife cut line) and/or open the stapled tissue between the rows of staples. Usually, but not always, the knife is associated with or travels with the staple drive member. Such instruments are disclosed in U.S. Pat. Nos. 10 3,079,606 and 3,490,675, the entire contents of which are incorporated herein by reference.

A later stapler disclosed in U.S. Pat. No. 3,499,591, the entire contents of which 15 are incorporated herein by reference, applies a double row of staples on each side of the incision or the knife cut line. This is accomplished by providing a cartridge assembly in which a cam member moves through an elongate guide path between two sets of staggered staple carrying grooves. Staple drive members are located within the grooves and are positioned in such a manner so as to be contacted by the longitudinally moving cam to 20 effect ejection of the staples. Other examples of staplers are disclosed in U.S. Pat. Nos. 4,429,695, 5,065,929 and 5,156,614, the entire contents of which are incorporated herein by reference.

Electrocautery devices are preferred in certain surgical procedures for effecting 25 improved hemostasis by heating tissue and blood vessels using thermogenic energy, preferably radiofrequency energy, to cause coagulation or cauterization. Monopolar devices utilize one electrode associated with a cutting or cauterizing instrument and a remote return electrode, usually adhered externally to the patient. Bipolar instruments utilize two electrodes and the cauterizing current is generally limited to tissue between the two electrodes of a tissue treating portion (e.g., end effector) of an instrument.

30 Even though stapling apparatus and electrocautering apparatus and techniques respectively are generally well suited to control bleeding along the knife cut line, other apparatus and techniques are herein envisioned.

Therefore, it is an aspect of the present disclosure to provide a surgical stapling apparatus that provides general hemostasis, tissue joining or welding, and also applies a wound closure material to body tissue that enhances one or more properties of the body tissue that is or is to be repaired or joined, for example, hemostasis along a cut line formed by a knife or other cutting means and/or along a staple line to reduce or prevent bleeding along the cut line and/or staple line.

SUMMARY

The present disclosure relates to surgical stapling apparatus, and more particularly, 10 to a surgical stapling apparatus having a wound closure material applicator assembly for applying a plurality of surgical fasteners to body tissue and dispensing a wound closure material, such as an astringent, to prevent staple line and knife cut line bleeding.

According to one aspect of the present disclosure, a surgical stapling apparatus for enhancing one or more properties of body tissue that is or is to be repaired or joined is 15 provided. The surgical stapling apparatus includes a staple anvil positioned on a distal end of the stapling apparatus and having a working surface and a staple cartridge positioned adjacent a distal end of the stapling apparatus and juxtaposable relative to the staple anvil. The staple cartridge includes a working surface, one or more rows of individual staple slots formed in the working surface, and a plurality of surgical staples individually 20 disposed within the individual staple slots. The staple apparatus further includes a driving member for firing the surgical staples from the individual staple slots and against the staple anvil and a wound closure material applicator assembly operatively associated with the stapling apparatus. The wound closure applicator assembly includes at least one conduit extending along at least a length of the driving member, and at least one reservoir 25 in fluid communication with the at least one conduit, the reservoir being for containing a wound closure material therein, and the conduit having at least one opening and being adapted to provide wound closure material therethrough to an area between the working surface of the staple anvil and the staple cartridge.

The at least one conduit can include a plurality of openings formed therein for 30 dispensing the wound closure material therefrom. Longitudinal translation of the driving member causes longitudinal translation of the at least one conduit across at least some of the individual staple slots, such that at least one of the plurality of openings is in communication with at least one of the staple slots.

